

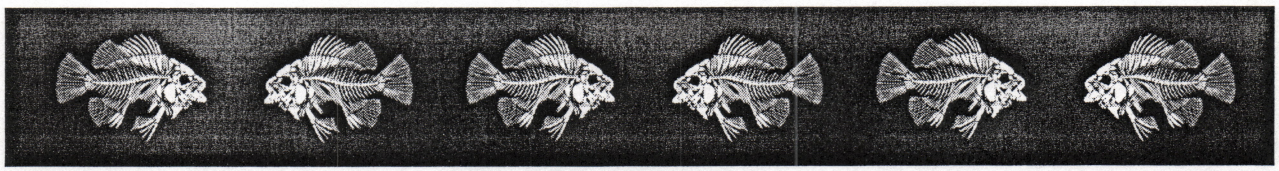
RESOURCE MANAGEMENT PLAN

FOSSIL BUTTE NATIONAL MONUMENT

JANUARY 2000

RECOMMENDED BY: Vinst L. Santa — Chief Ranger — 1-29-00 — Date

APPROVED BY: Dennis D. McCarrins — Superintendent — 1-30-00 — Date



To the Reader:

The project statements contained in this plan are reviewed annually, which may result in revisions and updates. It is also possible that new project statements may be added periodically as needed, or deleted upon completion of a project. Such changes will alter the summary data found in Table 2 and in Programming Sheets 1 and 2. In addition, any changes in park staffing or resource management work distribution will be reflected in Table 1. If current information is required regarding project statements or Table 1 (NPS Resource Personnel), please contact the park directly.

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I. INTRODUCTION

PURPOSE AND SIGNIFICANCE OF FOSSIL BUTTE

The significance of Fossil Butte National Monument to our nation's natural and cultural heritage is summarized in the following statements:

"To preserve for the benefit and enjoyment of present and future generations outstanding paleontological sites and related geological phenomena, and to provide for the display and interpretation of scientific specimens . . . " Act of October 23, 1972 (Public Law 92-537). (Appendix E - Enabling Legislation).

A fresh-water fossil assemblage makes Fossil Butte N.M. a geologic area unique to the National Park System. The site's importance stems from its unusual concentration of aquatic vertebrate remains. This is even more significant, as known locations of fossil fish of any age are relatively rare. Yet at Fossil Butte N.M. millions of fish fossils are present in context with insects, plants and other animals, providing a complete ecological snapshot of that time period.

Hesse (1939) summarized appropriately: "Few museums in the world, certainly none of the larger ones, are without specimens of the fossil fished from the Green River shales of southwest Wyoming. These are prize exhibition specimens and no other fossil-bearing formation in America has produced so many and such characteristic fossils as this great series of lake beds."

The 8,198 acres of the Monument contain a variety of flora and fauna unexpected by many visitors. The abrupt changes from dry brush and grasslands to forests, and the variety of wildlife including pronghorn, deer, elk, moose, beaver, hawks, and eagles, provide added dimensions to the experience of Fossil Butte N.M..

RESOURCES

Paleontology

Surveying the whole of the geological time scale, the era represented by the sediments at Fossil Butte N.M. is relatively recent. The time of invertebrate dominance of life forms had long passed; primitive plants and fishes had developed, followed by the appearance of amphibians and the first reptiles; dinosaurs had come and gone, birds appeared on the scene, flowering plants flourished, and major mammal groups were developing.

The superb fossil record allows accurate reconstruction of climate, geography and living creatures long vanished. Because of the excellent preservation of that time at Fossil Butte, we can reconstruct from that fossil record an accurate picture of climate, geography, and living creatures long vanished.

The period of deposition occurred 50 million years ago. Fossil Lake flourished for approximately 2 million years; as the smallest and shortest lived of the lakes of the Green River system. The lacustrine and riverine depositional environments were replaced by an erosional state when the lake basin was uplifted from about 1,000 feet above sea level to an elevation of 7,500 feet. The sediments have since weathered to produce the prominent buff colored buttes of the Green River Formation and bright red-banded badlands of the Wasatch Formation. These two formations provide a remarkably complete fossil record of this time in geologic history. The significance of the two formations is the completeness of the fossil record at this time in geologic history.

The Green River and Wasatch Formations are the most significant rock units in telling the Fossil Butte story. The Green River Formation is divided into the Angelo and Fossil Butte Members (Oriel and Tracy (1970). The Green River Formation within Fossil Basin has since been divided into lower, middle and upper units (Buchheim and Eugster, in press). The lower and middle units contain several types of facies including finely laminated, massive turbated, and fossiliferous limestones and oil shales. The greatest concentration of fossils is found within two fish bearing horizons of the middle Unit. Twenty-two fish species are known from the Fossil Butte Member of the Green River Formation (Grande, 1984). As work continues in the less explored layers, this figure is bound to increase. It is noteworthy that after 100 years of concerted collecting, an untapped resource remains to be studied.

The combined thickness of the three units is about seventy meters at the lake center (Buchheim, in press). Researchers conclude that deposition rates have varied greatly through certain portions of Fossil Lake. It appears that a greater amount of sediment deposition occurred toward the lake margins due to the precipitation of calcite as calcium-rich stream water mixed with alkaline lake water. The lake center is characterized by a highly saline-reducing environment that enhanced the preservation of laminated sediments and fossils (Buchheim and Eugster, in press).

The Wasatch Formation consists of fluvial deposits that underlie, interfinger and overlie the Green River Formation. The different members of the formation are characterized by pebble conglomerates, sand stones and the colorful banded mudstones that make up the Badlands of Fossil Butte. The sediments of the Wasatch Formation were deposited mainly by streams fed by surrounding uplands and various flood plains. Deltaic deposits of sands or mudstones created tongue deposits in the Green River Formation. Varying stages of iron oxidation create the many colored bands of the Wasatch Badlands (Oriel and Tracey, 1970). Paleontologically, the Wasatch Formation is very significant because it contains some of the earliest Eocene mammals in North America. Many fossils found in the Wasatch Formation are useful for relative dating and provide information on the evolution of mammals in the Tertiary Period. Fossils discovered include primitive horses, tapirs and primates. (Interpretive Prospectus, 1984)

Prehistory
This area is transitional between the arid basin and the mountains. Transitional zones generally support a greater variety of plant and animal resources than mountain or arid basin zones and seem to have been especially important to prehistoric hunting and gathering nomads. During certain times of the year, the transition zone probably provided certain foods essential to these societies reliant on seasonal availability of resources. The short growing season in this area is not conducive to horticulture or the development of large sedentary populations.

Archeological resources include:

Paleo-Indian period (12,000-8,000 B.P.) Cultural material from this period is not currently identified in the area. Projectile points are the primary representation of this period, but stone knives, blades, and scrapers are also found.

Early Archaic (Altithermal) Period (8,000-5,000 B.P.) Material from this period has been found in the park in association with a spring site on the eastern park boundary.

Middle Archaic Period (5,000-2,500 B.P.) The three sites identified in the Monument (Zeimens 1976) probably contain occupations dating to this period. Materials include projectile points of the McKean Techno-complex with expanding stems, convex bases, rounded shoulders, and very sharp points. Knives, metates, manos, and other stone tools were also found in these three sites.

Late Archaic Period (2,500-1,999 B.P.) Sites with late archaic materials are found within the park boundary. Diagnostic projectile points of this period include large corner-notched dart points of the Elko series, Besant, and Pelican Lake varieties.

Late Prehistoric Period (1,500-2,000 B.P.) Two distinctive types of projectile points represent this period. The "Great Basin Fremont-Influenced Rose Springs" type is characterized by being small and triangular-corner-notched with small stems. The "High Plains-Shoshonean" type is triangular-side or tri-notched.

Historic
Regular activities around Fossil Butte began around 1877. The Oregon Short Line to Sage WY, (10 miles west of Fossil Butte) was completed in 1881. Settlers with livestock arrived in 1884, and intense grazing apparently started in the 1890s.

In connection with regional geological surveys commissioned by the U.S. Government, Professor F.V. Hayden issued the first published notice of the fossil-bearing formations (Petrified Fish Cut at Green River WY, 1869). Since then fossils have been removed from the formations, and commercial quarriers have sold specimens to private collectors and to museums world wide. Several early

fossil quarries, and an A-frame cabin used by the Haddenham family, were identified in 1974 as part of the "Historic Plan, Fossil Butte National Monument."

We believe these and archeological sites 48 LN 326, 48 LN 1690, 1691, and 1692, are eligible for nomination to the National Register of Historic Places. In October of 1987, the Wyoming State Historic Preservation Officer determined the Chicken Creek Ranch site (48 LN 1693) not eligible for the National Register and it was removed from the Monument.

Climate

Extreme variations in temperature, ranging from minus 50° Fahrenheit in winter to 100° Fahrenheit in the summer, accompanied by periods of strong winds, create a harsh climate during much of the year.

Summer days are warm, nights are cool. Winters are clear and cold. The annual precipitation in this semiarid climate averages 9 inches; most of it falls as snow.

Landscape Characteristics

Fossil Butte lies in southwest Wyoming, in Fossil Basin, at elevations ranging between 6,800 feet and 8,000 feet. Ridges and buttes broken by steep arroyos and intermittent streams characterize the topography. Vegetation is sparse, except at springs and along streams, and consists mainly of shrubs and short grasses. Fossil Butte itself rises some 1,000 feet from the valley below. Four springs discharge from the contact between the Green River Formation and the Wasatch clay, with seasonal flows ranging from 1 to 25 gallons per minute. These springs on the sides of the slopes nourish aspen and cottonwood groves. Cultural landscapes are generally unknown.

Vegetation

Sagebrush steppe vegetation has dominated the Fossil Butte area for 7,000 to 10,000 years. Before settlement, the area supported dense stands of sagebrush, groves of timber and grass mixed with sagebrush on the hills at higher elevations. The southeast face of Fossil Butte had a stand of conifers, but now has cottonwoods. The conifers were harvested for railroad construction. The appearance of the country apparently has not changed significantly since settlement, except that the sagebrush may be taller.

The present vegetation of Fossil Butte National Monument is a complex mosaic of 12 intergrading vegetation types controlled by interrelationships of soil, moisture, topography, and natural and man-caused disturbances. Six species or subspecies of woody sagebrush are present, but only three dominate the area. All mixed timber stands and many sagebrush stands show evidence of past fires. The fire interval is 8 to 21 years in the Mixed Timber Type. Natural fires in the sagebrush occurred at 18 to 49 year intervals, the most recent in 1981 (Dorn, 1984). Native American effect on the area's vegetation is not documented.

U.S. Fish and Wildlife Service (1988) "Status Categories for Candidate Species" lists five Category 1, 2, or 3 plant species have potential to exist in the Monument. The Monument has documented Physari dornii, a Category 2 plant.

Wildlife

About 11,000 years ago, species of horse, camel, and bison were present in the area. The horse and camel became extinct approximately 8,000 years ago and 10,000 years ago, respectively. The bison evolved into a smaller, modern form, and small mammal abundance and diversity declined. Archeological data suggest that pronghorn, bison, mule deer, elk, sage grouse, prairie dogs, cottontails, jackrabbits, moles, ground squirrels, chipmunks, woodrats, and badgers were present before historic settlement.

In addition, early travelers mentioned grizzly bear and gray wolf. Just before settlement, the grizzly bear, bison, elk, and pronghorn were eliminated from the area. Since settlement, moose have appeared, pronghorn and elk have reappeared, and mule deer have become much more abundant. Prairie dogs have declined and gray wolves were eliminated but could reappear reintroduced in areas to the north of the park (Yellowstone and central Idaho). At least 34 species of mammals, 72 species of birds, and 5 species of reptiles and amphibians have been observed in Fossil Butte National Monument since 1974 (Statement for Management, 1991).

PURPOSE OF THIS PLAN

The purpose of this plan is to: identify the known natural and cultural resources of the Monument; document the existing knowledge of their condition; and provide strategies for the management and preservation of the resources of the Monument.

The plan supplements and provides more detail to the resource-related management objectives outlined in the Monument's General Management Plan (March 1980), and Statement for Management (March 1991). It includes proposed action for implementation and research actions and serves as a set of specific management guidelines. Project statements are determined on the basis of approved management objectives and National Park Service policies.

Management constraints and completed research serve as guidelines for projects. The plan serves the superintendent in two general ways: (1) as a manual for management activities that will preserve the natural environment (including restoration of the resource similar to pre-grazing conditions) or achieve an environmental status that complies with Park Service standards; and (2) as a set of research projects and priorities designed to obtain additional information for management and interpretation.

Objectives of this plan include:

1. Summarize the resource values and purposes of the Monument;

2. Analyze the significance of resource management needs and problems and rank them in importance;

3. Propose specific actions and identify monetary costs and personnel needs for dealing with the identified needs and problems;

4. Present a multi-year program to achieve measurable progress in accomplishing the proposed actions, and

5. Provide the forum for an interdisciplinary approach to the park's resource management issues.

As our knowledge increases and conditions change, this plan will be modified.

A two-year review of the plan will coincide with the review of the Monument's Statement for Management, with a formal update at least every four years. Documentation of periodic reviews and revisions will be submitted to the Regional Director for approval.

Annual Report Requirement
An annual report on project status and accomplishments, along with updated tables and programming sheets, will be prepared and submitted to the Regional Director by January 31 each year. Project Statements may be updated any time, when changes in conditions, knowledge, and priorities occur.

Additional management guidance is found in the Monument's enabling legislation and other legislation, Executive Order's, National Park Service Management Policies, and in the Monument's Statement for Management and General Management Plan.

RESOURCE MANAGEMENT OBJECTIVES

In accordance with the 1916 "Organic Act" establishing the National Park Service, Fossil Butte National Monument shall be managed:

> "...by such means and measures as conform to the fundamental purpose of the said parks, Monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Specific resource management objectives identified in the Statement for Management (1991) include:

- To limit extraction of the paleontological resources to scientific research that may be required in connection with Monument development and to fill gaps in the knowledge of these resources that cannot be obtained elsewhere.

- To obtain a representative collection of fossil specimens to adequately display and interpret the paleontological resources to the public.

- To encourage and foster scientific research to provide information for a comprehensive and accurate interpretive program.

- To protect and preserve within the constraints of the enabling legislation all elements of the natural and historic resources of Fossil Butte N.M..

- To provide an inventory and evaluation of the cultural resources of the Monument.

- To maximize use of alternative energy sources and technology.

- To develop administration and visitor use facilities necessary for enjoyment and use of the national Monument in a manner that will have minimum impact on the resources.

- To develop an interpretive program and facilities that will bring the visitor to understand this geological epoch in association with others (well represented in the National Park System) and the vast evolutionary changes, both biological and geomorphological, that have taken place in the earth's history.

Additional Resource Management Objectives include:

- Restore the stability and habitat values of Chicken Creek.

- Encourage and foster research to support park and resource management.

II. PRESENT RESOURCES STATUS

NATURAL RESOURCE BASELINE INFORMATION

This section presents the current status of baseline information existing for all categories of natural resources within Fossil Butte N.M.. It identifies major resources, and assesses the completeness and reliability of baseline inventories. A summary of the information is in a table at the end of this section.

NPS-75, the National Park Service Inventory and Monitoring Guideline, identifies the following as the minimum baseline information needed for a viable Resource Management Program. The following table summarizes the status of Baseline Information at Fossil Butte N.M..

SUMMARY
OF
NATURAL RESOURCE BASELINE INFORMATION

Meets, does not meet, or exceeds the recommended minimal set of natural resource information in 'Appendix A of NPS-75.

INVENTORY COMPONENTS	DOES NOT MEET	MEETS	EXCEEDS
Historical Data Base	X		
Species Information	X		
Species List	X		
Biologic Surveys	X		
Species Distribution	X		
Digital Vegetation Maps	X		
Digital Cartographic Maps	X		
Digital Soils Map	X		
Digital Geology Map	X		
Water Resource Inventory	X		
Water Quality Data	X		
Air Quality Stations	X		
Air Quality Data	X		
Precip./Meteorological Data		X	

Historical Database
A historical data base has not been compiled.

Species Information
Vegetation Vegetation varies widely in Fossil Butte N.M., including open grassland, sagebrush steppe, aspen stands, mountain shrub and pine/fir stands. A vegetative survey of Fossil Butte N.M. was completed in 1973 by Beetle and Marlow and a vegetation transect study was completed in 1977, author unknown.

Subsequent documentation of the vegetative communities was made in the 1984 "Grazing Impact Study," by Dorn of the Mountain West Environmental Services. Dorn documented and mapped 12 vegetation types. In addition, the report lists the bird, reptiles, amphibians, and large and small mammals that might be found in the Monument.

George Jones of The Nature Conservancy completed Vegetation Mapping in June 1993.

Wildlife In 1991 a volunteer, in cooperation with the Wyoming Game and Fish Department, conducted a one-week trapping project. Two traplines were set in two vegetation types. The state is in the park files.

Small mammal densities were documented by Rado (1976, 1977) for five vegetation types described as open grassland, sagebrush steppe, aspen stands, mountain shrub and pine/fir stands.

Other animal species listed by Rado include large mammals, insects, reptiles and amphibians. Dorn (1984) listed historical and present day vertebrates in his report.

In 1988 Monument staff initiated a large mammal monitoring program. Monthly, as conditions allow, 10 stations are visited and all observed wildlife is documented. The program has continued in all subsequent years to date.

Durkes conducted a bird survey in the summer of 1978. The list includes 46 species from Fossil Butte N.M. and the surrounding area. A list of birds additional to Durkes' list was compiled in 1988 by a graduate who observed the birds while working in an experimental fossil quarry. Additional species have since been documented. Cain conducted a general raptor survey of the Monument in the spring of 1989.

Threatened and Endangered Species There have been no documented surveys for Threatened and Endangered Species.

Species of Special Concern
Endemic species There are no endemic species of special concern documented. Surveys are inadequate to determine whether a species of special concern exists.

Exotic species Spotted Knapweed, Henbane and Canada and Musk Thistle exist in the Monument. Active programs to reduce their numbers are in place. Other exotic species may occur, although adequate survey data to identify them does not exist.

Species information does not meet minimum baseline information standards.

Cartographic Mapping
The Monument is included in three 7-1/2 minute (scale 1:24,000) quadrangles titled The Rock Slide, Wyoming, Nugget, Wyoming and Fossil, Wyoming. Kemmerer Reservoir Wyoming is also useful in examining the Fossil Butte N.M. area.

Fossil Butte N.M. is also included in Sage, Wyoming and Kemmerer, Wyoming 15 minute (scale 1:62,500) U.S.G.S. maps.

"Geologic Map of the Kemmerer 30′ x 60′ Quadrangle, Lincoln, Uinta, and Sweetwater Counties, Wyoming," 1992, M'Gonigle and Dover and "Geology of the Sage and Kemmerer 15 minute Quadrangles, Lincoln County, Wyoming," 1975, Ruby, Oriel and Tracy, describe the geology of Fossil Butte and contain an overall area map; the latter contains a structure section (cross section) of Fossil Butte. Aerial photographs of Fossil Butte taken in 1974 are in the park files. A few aerial photographs were made in 1988 of proposed development areas.

Status: Adequate mapping exists for level II baseline information. Digital mapping is needed, some is available for purchase.

Soils Mapping
The Soil Conservation Service completed an "Order 3" soil survey of Fossil Butte N.M. in 1974. The resulting soils map and survey information is in the Monument library.

Erosion Accelerated by grazing, breached dams and a lowering of the stream channel downstream, serious erosion occurs in the park's main drainage, Chicken Creek. In 1986, Monument personnel established photo monitoring points along the drainage. At regular intervals during the summer season the stream channel is photographed at these photo points. In 1994 the Monument began implementing the Chicken Creek Restoration Plan to remove the breached dams and reduce erosion through establishment of vegetation.

Status: The soils information meets the Level I standard.

Geology Mapping
The structural geology of Fossil Basin and the underlying "Overthrust Belt" is well documented in literature, including "The Geologic History of Fossil Butte National Monument and Fossil Basin" by McGrew and Castillano.

The stratigraphy of Fossil Butte is described in "Uppermost Cretaceous and Tertiary Stratigraphy of Fossil Basin, Southwestern Wyoming," 1970, Oriel and Tracy and "Paleoenvironments and Paleoecology of the Eocene, Green River Formation, Wyoming," 1986, Buchheim.

Status: Minimum documentation of geologic resources exists. Additional study is required to gain a complete understanding of the Green River and Wasatch formations, the park's primary geologic resource. Studies needed include: lake margins (maximum and minimum); fluvial inlets; variation in bottom gradient; water chemistry; depositional environments; incoming and outgoing stream channel locations; and documentation of the Green River Formation exposure in Fossil Basin. Geology maps are not digitized.

The Geology baseline information meets the Level I standard. When digitized into a GIS format, it will meet the Level II standard.

Water Resources Inventory
A study entitled "Feasibility on Developing Ground Water Supplies in Fossil Butte National Monument, Wyoming," University of Wyoming, Peter Huntoon, was conducted in 1978. The report discusses the hydrologic features of the Wasatch Formation and evaluates three springs inside the Monument.

Status: Hydrology meets the Level I standard.

Aquatic Resources There are no inventories, lists or documentation of the aquatic resources in Fossil Butte N.M..

Status: The Fossil Butte N.M. Biological Resources Baseline Information does not meet the Level I effort. Vegetation information is adequate but terrestrial animal and all aquatic biologic resource inventories are inadequate or nonexistent.

Water Chemistry
Studies of water resources in Fossil Butte N.M. pertain only to obtaining drinking water. Limited documentation exists of the hydrology at Fossil Butte N.M. other than the drinking water studies identified above (Huntoon, 1978).

Status: The surface water data provided by Huntoon's report is the only chemical data that meets Level I standards. No other chemical data meets the minimum Level I standards. Needed for key bodies of water are Alkalinity, pH, Conductivity, Dissolved oxygen, Rapid bioassessment baseline, Temperature, Flow, as well as other constituents where important as determined on a case-by-case basis.

Air Quality
The WASO Air Quality Division has determined through review of existing information that there are 26 permitted major stationary sources of air pollution (emitting more than 100 tons per year of one or more regulated pollutants) within a 100-kilometer radius of Fossil Butte N.M. in Utah and Wyoming. In 1991, these sources emitted 53983.1 tons of sulfur dioxide, 461.7 tons of volatile organic compounds (an ozone precursor), 7521.3 tons of fine particulates, 6089.5 tons of carbon monoxide, and 62773.9 tons of nitrogen dioxide. There are other minor sources in the area, such as oil and gas wells and gas compressor stations.

Winter air quality is diminished by a haze from unknown sources that hangs in the valley south and east of the Monument.

The park has no air quality data. Air quality monitoring stations are located at four sites east of the Monument in Sweetwater County. It has yet to be determined if the data from these stations is representative of the Monument.

Sound Monitoring from two in-park stations was conducted for a two year period from 1992 to 1993. A report from the Rocky Mountain Regional Office is pending.

Status: Air and sound qualities do not meet Baseline Information Standards

Meteorology
From 1972 through 1990 park headquarters was located in Kemmerer, 10 miles west of the Monument and no on-site weather recordings were collected. Visitor facilities at the Monument were constructed and the staff moved on site in July 1990. A National Weather Station was established in July 1990. High, low and five o'clock p.m. temperatures and precipitation are recorded. In October 1992 an automated weather station was established that records temperature, humidity, barometric pressure, wind speed and direction, precipitation, solar radiation, and soil moisture. The station records hourly and is hard-wired into a park P.C. computer and downloaded weekly.

Snowpack is not recorded.

Minimal historic weather data from Kemmerer including high and low temperatures and precipitation is available.

Status: Meteorological data meets minimum Level I standards.

CONDITION OF NATURAL RESOURCES

Fossils/Paleontology

Established in 1972, Fossil Butte National Monument preserves outstanding paleontologic sites and related geologic phenomenon from the Fossil Butte area. Fossil Butte is a remnant of ancient freshwater Fossil Lake, which was approximately 64 kilometers long and 40 kilometers wide. The Wasatch badlands, the terrestrial component of these ancient deposits contain important mammal fossils used in paleontological dating. Fossil deposits are found on federal, state and private land.

Fossils from Fossil Lake and the Wasatch Formation are internationally significant because of their quality of preservation and abundance. They record many elements of the environment that existed here 50 million years ago. Fossils are found in outcrops near the top of three prominent ridges and the colorful badlands that run through the park.

In 1984, Cope published one of the first discussions on the Green River Formation, including a detailed description of the fish fauna. Bradley (1984) was one of the first researchers to make paleolimnological interpretations of ancient Fossil Lake and developed a model for the death, burial and preservation of fossil fishes. McGrew and Casilliano (1975) and McGrew (1975) dealt with some taphonomic aspects of fossil fishes in Fossil Basin. One of the most complete systematic discussions of the fauna and flora of Fossil Lake was completed by Grande in 1984. Sedimentological studies have been pursued in detail during the last 15 years by Buchheim and Surdam (1977, 1981, 1985). Several questions are being pursued on the geometry, geochemistry, salinity and dynamics of the ancient lake.

Hayden (1969) completed the first study describing the Wasatch Formation. The term "Wasatch" was used in a broad and general sense. Veatch (1907) tried to subdivide the units found at Fossil Basin into more homogeneous sections. The Wasatch Formation was since divided by Oriel and Tracey (1970) to include: the Basal Conglomeratic Member, the Lower Member, the Main Body, the Bullpen Member and the Tump Member. Most of fossils have been collected in the Lower Member and the Main Body. Meniscotherium (primitive herbivore), Hyrachetherium (primitive horse), Haplomylus (primitive herbivore) and Coryphon (tapir like animal) make up a large number of the mammal fossils found within these two members and are described by Granger (1914), Gazin (1952, 1962) and Oriel and Tracey (1970).

Both the Green River and Wasatch formations have been studied since the late 1800s with the most extensive research beginning in the 1940s. Several questions concerning the Green River Formation remain, including the depth, salinity, and paleogeography of Fossil Lake. The exact age and depositional environment of the Wasatch Formation also needs determination. Finally, researchers do not

completely understand the evolutionary link between the primitive mammals of the Eocene and later forms.

Fossils quarrying on Fossil Butte and within the surrounding area began about 1881 when the railroad was built through the area. Collecting on Fossil Butte did not end until the establishment of the Monument in 1972, even though it was public land. A complete understanding of the historic extent of commercial/private collecting within the Monument is unknown.

Fossil resources within the Monument continue to be lost due to erosion and probably theft or damage by visitors. Specific documentation of fossiliferrous outcrops including inventory, susceptibility to damage from humans or weather, and quality of fossil resource does not exist.

Vegetation
The vegetative communities are stable and remain predominantly native despite 100 years of grazing prior to 1990. As 1989 was the last year of livestock grazing on the Monument, changes in the vegetation are expected. Dorn's 1984 study identified 12 vegetation types and provides a thorough documentation of the vegetation. The documentation and mapping of vegetative communities should be repeated when post grazing could be adequately evaluated.

Exotic species
Four exotic plant species are prevalent enough to be a problem at Fossil Butte N.M..

Black Henbane (Solanaceae) is found along park roads where it was introduced with road gravel. A noxious biennial, it produces up to one million seeds per plant. Control has been by manually chopping plants approximately 15 person days per year. Beginning in 1990 herbicides were used to control the plant.

Canada thistle (Cirsium arvense) is an exotic perennial that invades moist and/or disturbed areas. It occurs in the Monument along road shoulders, slumps and near spring #1. Canada thistle propagates by seed and rhizomes. Herbicides are the most effective control of thistles although they have many limitations. The Monument's control program before 1990 was to chop the stalks at bud stage. Chopping continued after 1990 at spring #1 and in some slumps, while herbicide control is used along the park road and in appropriate areas.

Native and exotic insect control was initiated in 1993 with little obvious results.

Spotted Knapweed (Urophora affinis) was discovered along the main park road in 1992. Control measures include herbicide spraying and pulling the stalks.

Musk Thistle (Carduus nutans) occurs in limited quantities in the Monument. Some stands are infested with the exotic insect Rhinocyllus conicus. We believe this insect occurs because of widespread releases by county personnel in the 1970s. The National Park Service does not approve releases of this insect at this time because of the fear they may also prey on native thistles. The Monument is not taking any action to eliminate this insect.

Fire
The draft Fire Management Plan specifies immediate control of all wildfires at Fossil Butte National Monument.

The role of fire is not documented or completely understood at Fossil Butte N.M.. Though undoubtedly a natural part of the historic environment, frequency is unknown. Further study is necessary to determine natural frequency, and potential effect on archeological and cultural resources. Identifying and restoring the pre-livestock vegetative community is the goal.

Elimination of fire and 100 years of grazing have likely had the greatest impacts on the vegetative community. Domestic livestock grazing on grass species and fire suppression have allowed the sagebrush species to increase. Historically, fires would deter sagebrush growth and allow the grass species to increase in density. The unnatural condition of grazing and fire suppression has likely caused an increase in sagebrush densities.

Limber pine stands on north facing slopes were infested by Ipps beetles. A U. S. Forest Service (USFS) evaluation in 1988 indicated that the infestation had reached its natural peak and that resources outside the Monument boundaries were not threatened. The report concluded that control efforts were unnecessary. The bark beetle infestation may be a result of the lack of fire in the environment.

Soils
Except in streambeds and at slumps, soils in the Monument are stable. Most areas are protected from wind erosion by vegetation. Cliff areas containing fossils are subject to erosion from runoff, freeze\thaw and wind. Slump areas are characterized by clay soils that flow downhill when lubricated by water. This is a natural phenomenon and not a management concern.

Erosion Active erosion occurs in Chicken Creek, the main park drainage. The woody species that once naturally existed here are nearly eliminated, probably because of grazing. Woody species (willows) and riparian grasses reduce erosion of stream banks. Livestock graze the grasses and young woody growth from the riparian zone before moving to the less desirable areas. As the animals return to the stream to water, they graze any regrowth in the riparian zone. This pattern greatly reduced woody growth and removed the grass biomass that slowed the water flow and caught sediments in the stream channel, resulting in accelerated erosion.

Additional erosion problems occurred at four man-made stock dams. These dams have breached and now drain outside the original stream bed. Because the dams caught sediments, the stream channel, in what was the pond area, is now elevated above the original stream channel. New channels to the original stream bed have developed and are steeper than the original stream channels.

Willow plantings were started in 1986 to replace the willows lost to grazing. Though survival rate is low, hope is the surviving willows will hold the existing soil, catch sediment and repopulate the streambed. The low survival rate may be a result of ongoing drought conditions that cause cessation of stream flow in mid-summer. ¦--(THIS DOESN'T SEEM TO BE A COMPLETE SENTENCE.)--¦ Willow shoots are collected and transplanted from drainages in the immediate area of the Monument.

Wildlife

Mammals Wildlife species, population estimates, and distributions are not adequately documented at Fossil Butte N.M.. Existing wildlife lists appear to have been developed from field guides or regional lists.

The park wildlife monitoring program documents wildlife numbers in a general way. There are no recent population estimates of wildlife species.

Rado (1977) developed population densities for small mammals after trapping them in 1976 and 1977. Trapping sites were not identified to a degree that the study could be repeated.

The Monument generally is three miles wide and five miles long. Large mammals move in and out of the Monument on a daily basis and migrate through. During hunting seasons, pronghorn, mule deer and Shiras moose numbers increase in the Monument. These large mammals and Rocky Mountain elk winter on the Monument. Some animals summer on or near the Monument; others seasonally migrate from summer ranges north of the Monument to winter ranges south of the Monument. As grazing was terminated after 1989, large native mammal populations would be expected to increase. The largest increase will likely be in elk wintering because of an increase in available forage.

Immediately west of the Monument is a major mule deer migration route. Deer move from the Bridger Teton National Forest to BLM winter range in the fall, and back in the spring.

Birds/Reptiles/Amphibians Although lists exist for these animals at Fossil Butte N.M., documentation is poor and status is unknown.

Most birds summer in Fossil Butte N.M. and winter elsewhere though some birds are year-round residents. Long- or short-term population trends are unknown. An inventory and monitoring/ documentation program is needed.

Cain (1989) documented six raptor nests: two Prairie Falcon and four Golden Eagle. One eagle and one falcon nest were active. Cain also observed Northern Harriers, Red Tailed Hawks, Swainson's Hawks and American Kestrels.

The BLM monitors an area west of Ruby Point where eagles winter and feed on road-kill wildlife along WY Highway 30. Whether the eagles winter on the Monument is unknown.

Habitat exists for reptiles and amphibians, however, documentation of their existence or population trends does not exist and their status is unknown.

Threatened and Endangered Species
According to a 1988 U.S. Fish and Wildlife Service report, no threatened or endangered species are known to be permanent residents of Fossil Butte N.M.. Of the ten listed species, three may occur in Fossil Butte N.M.. Bald eagles winter in the vicinity and are occasionally seen in the Monument. Whooping cranes may migrate through the area in the spring and fall.

Black-footed ferrets are not believed to be present in the Monument. The Monument does contain a small population of white-tailed prairie dogs (4 towns total 18 acres), but not enough to sustain a ferret population. The prairie dog colonies were surveyed in 1987 and 1989 by Wyoming Game and Fish personnel and did not qualify as a potential black-footed ferret habitat by U.S. Fish and Wildlife Service Guidelines.

State of Wyoming candidate species that may occur in Fossil Butte N.M. include:
Birds--white-faced ibis, long-billed curlew;
Plants--Antennaria arcuata, Arabis pusilla, Astragalus jejunus, Cleome multicaulis, Physaria dornii, Trifolium barnebje. Of these, physaria dornii is present on calcareous ridges and slopes ($\leq$ 40°) in Fossil Butte N.M..

There are no areas of special concern to wildlife or critical habitats.

Water Resources
Water in Fossil Butte N.M. originates from rainfall, snow melt and springs along the base of the Green River Formation. The Green River Formation is the top layer of the three main ridges in the Monument. Springs discharge from 200 to 400 feet below the top of the ridges where the Green River limestone contacts the Wasatch clay.

The Monument uses Spring #2 for the park water supply. The spring was developed in 1990 and a water pipeline serves the picnic area, visitor center, maintenance shop and will serve park housing when built. An orifice in the spring box allows 2.5 gallons/minute to flow down the pipe. Predeveloped spring flows (monitored for two years) ranged seasonally between 25 and 3 gallons/minute in what

were considered dry years. After development, the spring seldom overflows. Reduced water supply may be due to drought, damage to the underground spring characteristics from development, water back-up into the spring box allowing the water to find another fissure to drain into, or another phenomenon yet unknown.

Accurate documentation of all of the spring locations, flow and water quality does not exist. Huntoon (1978) documented 12 springs and wells in the Fossil Butte N.M. vicinity and two wells and three springs within Fossil Butte N.M. including chemical analysis.

Streams resulting from springs vary in volume throughout the year. Some streams flow to the park boundary, others only reach the boundary in early spring. Stream flow depends on winter snowpack and other unknown factors.

Chemical analysis of precipitation does not exist.

The enabling legislation for Fossil Butte N.M. stipulates that water in excess to Monument needs be available to interests outside the Monument boundaries. An overall analysis of water resources is required before any determination of surplus can be made.

The Monument contains the headwaters of all its surface water and has no known surface water threats. Ground water could be threatened by gas/oil exploration (discussed further in External Issues).

Geologic Resources

The complete geologic history of Fossil Basin involves many stratigraphic units. Most of these are not exposed within the Monument itself but are known from outcrops outside the boundaries of the Monument and from deep wells.

At the base of the stratigraphic section are rocks of Precambrian age. Although not penetrated by wells within Fossil Basin, they probably occur as much as 25,000 feet beneath the surface. They likely consist of metamorphic and intrusive rocks. Beginning about 600 million years ago at the beginning of Cambrian time, sedimentary deposits accumulated. These are marine and continental in origin, and range in age from early Cambrian to early Tertiary (50 million years old). Some 34 geologic formations are recognized in this thick section.

Within the Monument itself, the oldest rocks exposed are the Triassic Thaynes Limestone near Rubey Point. All of the Late Cretaceous rocks are folded and faulted and are often buried by younger horizontal deposits.

Fossil Basin is a small, linear and structurally controlled basin in the southeastern part of the Wyoming overthrust belt. This "overthrust belt" is represented by a number of small mountain ranges and high ridges formed by the "thrusting" of sedimentary rocks over other sedimentary rocks. Topographically, Fossil Basin

is bounded by the Crawford Mountains and Tunp Range on the west, by Oyster Ridge on the east, and by the Uinta Mountains on the south. The Crawford Mountains, Tunp Range, and Oyster Ridge are areas of high relief developed upon southerly extended salient ridges of deformed Paleozoic and Mesozoic strata. In the center of Fossil Basin these earlier rocks are covered by a veneer of early Tertiary sediments. Superficially, Fossil Basin appears to be a broad syncline with tilted beds dipping sharply or gently basinward from the basin margins. The Tertiary sedimentary cover, however, partially obscures what is a more complex structural history.

Following deposition of the Late Cretaceous Adaville Formation, Fossil Basin endured a period of intense structural deformation. This deformation was the result of compressional forces acting along a more or less east-west alignment. The strain, or the resolution of these forces, developed along a north-south alignment or perpendicular to the compressional forces. As the stress level became too great, the rocks were first folded and then faulted. Initial faulting of the rocks relieved some of the stress; however, with continued application of compressive forces, many stages of folding and faulting were generated. Because the alignment of the compressive forces remained about the same throughout deformation (i.e., east-west) and because the strongest relative compressive forces were from the west, successively younger folds and faults were generated in an eastward direction.

In early Eocene times, continued down-warping formed the basin in which Fossil Lake developed. By the late Eocene, however, basinal subsidence could no longer keep pace with deposition and the dominantly lacustrine (lake) sedimentation was replaced by a fluviatile (riverine) sedimentary regime. Deposition of fluviatile sediments probably continued into the later Tertiary when, in the late Pliocene, regional uplift of the Rocky Mountain interior reversed the sedimentary cycle from depositional to erosional.

The last 3 or 4 million years of geologic history have witnessed the erosion of much of the Tertiary sedimentary fill from Fossil Basin. Fossil Butte and the Hams Fork Plateau to the northeast of the butte are high erosional remnants of this early Tertiary basin fill. The traces of the Absaroka and other thrust faults are buried beneath these remaining Tertiary deposits in Fossil Basin. (McGrew and Casilliano, "The Geologic History of Fossil Butte National Monument and Fossil Basin.")

The stratigraphy and depositional environment of Fossil Basin is the subject of ongoing study by Dr. Paul Buchheim of Loma Linda University. His work and cooperation have been invaluable to the Monument.

Night Sky and Quiet

The Monument's remote location, isolation from industrial plants and artificial light, combine with many cloud free nights to contribute to the outstanding view of the night sky and a general lack of unnatural noise.

Threats and External Issues

Fossil Theft Increased world wide popularity of fossils has made the resource increasingly subject to theft. As fossils are legally collected around Fossil Butte it is tempting for thieves to also collect fossils from the Monument. The BLM and private landowners in the area are experiencing losses from isolated fossil localities. It is very difficult to determine where an individual fossil actually came from. Although Fossil Butte N.M. has yet to document any more than minor theft, the potential for additional theft is very high.

Grazing The 22 miles of park boundary is surrounded by Bureau of Land Management (BLM) land, state land and 1.5 miles of private land. The land around the park supports grazing for cattle and sheep. Routine upkeep of a boundary fence prevents most livestock trespass and consequent impacts from grazing. Grazing can cause dust and weed problems.

Sheep stockmen affect wildlife outside the park with M44 "Coyote getters." M44 is a cyanide poison that fires into the mouth of the animal that pulls the scented bait. Generally specific to coyotes, but raptors, bobcats and domestic dogs are at risk by M44 cartridge use. Ranchers sometimes use M44 cartridges in the spring when their sheep are lambing. Whether the cartridges are removed from the area after the sheep are moved is unknown.

Mineral Exploration

Oil and Gas The geologic formations below the Monument are part of the "Overthrust Belt." These overthrust layers contain pockets of hydrocarbon resources. In the early 1980s, the over-thrust belt was intensively drilled to capture these resources.

The decline in oil exploration activity by the mid-1980s prevented wells from being drilled next to Fossil Butte N.M.. Renewed activity beginning again in the late 1980s saw the surrounding area affected again. All of the acreage adjacent to the west boundary is leased. Additionally, 360 acres within the Monument (sec. 23,36,35; T22N, R118W) have privately owned mineral rights, with no surface occupancy requirements. Most of the area west of the Monument is included in a Federal Exploratory Drilling Unit, the "Boxer Jack Unit".

Many seismic exploration lines have been explored around the Monument. The basin immediately west of the Monument was intensively impacted by seismic exploration during the summers of 1988 and 1989. In 1991 the "Boxer Jack" well was drilled in Nugget Canyon two miles west of the Monument . The well, drilled to 13,000 feet, proved to be a "duster", but potential remains for additional wells along the park's west boundary. Wells in this area would be within 2 miles of the visitor center and picnic area and visible from both. There is potential for 7 to 10 wells in this view shed.

Impacts of drilling wells include new roads, traffic, dust, noise and exhaust gases from trucks and diesel engines. Should the well be productive there will be a constant noise of pump motors and regular truck traffic to service the well. Longer term impacts can include effects of toxic chemicals and heavy metals from drilling fluids, salt water disposal problems, spillage, inadequate plugging of abandoned wells, pumpjacks and storage tanks on dirt pads, aquifer pollution, noise and visual pollution.

Wells within sight of the Monument would be a visual intrusion and may result in impacts to the wildlife and vegetative communities. Well activity can potentially affect air quality, visual quality, visitor health and safety, and the quality of their visit. Earth moving at well sites may impact fossil bearing layers.

Hydrogen sulfide gas (H_2S), an extremely deadly gas occurs in nearly 100 percent of the wells drilled in this area. The "Rode Hollow" gas field, six miles southwest of the Monument, produces this "sour" H_2S gas.

Coal Strippable coal resources occur about 5 miles east of the eastern boundary of the Monument, and about 5 miles south of the southern boundary of the Monument. This area contains the largest open pit coal mine in North America. The mine is over a mile wide and 1000 feet deep. Although downwind, potential noise and dust pollution from open pit mines remain a concern.

Future mining operations will proceed north, bringing mining activity closer to the Monument.

CULTURAL RESOURCE BASELINE INFORMATION

Summary of the status of cultural resources appears in the Appendices under "Cultural Resources Documentation Checklist" and "Summary Charts for Cultural Resources". Other aspects of cultural resource baseline information are addressed in the CULTURAL RESOURCES STATUS section below.

CULTURAL CONTEXT/THEME

Cultural context themes and subthemes that correspond to the themes listed in "Revision of the National Park Service's Thematic Framework, June 1994" have not been identified.

CULTURAL RESOURCE STATUS

Archeology
To address the general cultural sequence and provide a general framework for the prehistoric activities that actually took place within the Monument, it is necessary to discuss the information known from the surrounding area. However, archeological understanding of southwestern Wyoming is poor.

Fossil Butte lies physiographyically within the Wyoming Basin, which is within the Plains Culture area. It has been suggested that the area served as a natural corridor between the Great Plains and Great Basin culture areas (Mulloy 1954; Sharrock 1966; Jennings 1957; Aikens 1966; Day and Dibble 1963).

Topographically this is feasible, and some evidence exists to support this interpretation. However, no evidence suggests the existence of established trade networks or major population movements between the two areas. Contact probably involved marginal groups working back and forth to take advantage of various ecological zones. In all probability, such contact resulted in a certain amount of cultural diffusion over a long period of time. Past studies of the general area were of an inventory or salvage nature. Unfortunately, in most cases, these inventory projects were not followed by excavation; therefore, the potential of many reported sites is not fully known. In many instances, the sites have been lost to vandalism, natural erosion or inundation.

In summary, although the region and Monument contain abundant archeological resources, no comprehensive studies have been made.

Archeologic Resources in the area include:
Cultural material from the Early or Paleo-Indian Period (12000 - 6500 B.C) occurs on the surface in all parts of the region. This is readily apparent from studying amateur collections.

Altithermal Period (6500 - 2700 B.C.) occupation (Bryson, Barreis and Wendland 1970) has not yet been recognized in the area. However, cultural horizons from this period of climatic desiccation in western Wyoming do occur in adjacent areas and, may exist in the Monument (Frison 1976a, 1976b).

The majority of surface finds and sites located as the result of past surveys probably represent the Middle Archaic and Late Archaic Period (2700 B.C. - A.D. 500). Most of these sites are small, superficial, single-component Archaic manifestations and have been conspicuously ignored by those searching for more extensive and attractive stratified sites.

Recent investigations in the Green River Basin yielded a Late Prehistoric Period (A.D. 500-1800) buffalo trap and butchering site (Frison 1973) and a Shoshonean campsite (Frison 1971). Two other Late Prehistoric antelope traps were reported from that area but remain to be fully investigated. Many additional Middle and Late Archaic Period and Late Prehistoric Period sites are known to exist in the region but have not been subjected to professional investigations or documented in the literature.

Historic Period
Remains from the Historic Period are also plentiful (Purdy 1959). Famous pioneer routes, such as the Cherokee Trail, Oregon-California Trail and Mormon Trail, mark the arrival of early European settlers. The region was important to early fur traders

who used it extensively. Two early outposts, Fort Bridger and Fort Supply, and the famed mining complex at South Pass City are also of historic interest (Zeimens 1976). The Oregon Trail and two well marked and interpreted graves associated with the Oregon trail are within five miles of the Monument's northern boundary. Before establishment, the Monument area was used for ranching, including sheep herding and cattle grazing.

Archeoloic Investigations

The first systematic professional archeological investigation of the Monument was a reconnaissance level survey conducted in 1973 by personnel from the Department of Anthropology, University of Wyoming (Zeimens 1974; 1976). The entire Monument was not examined in the course of this work, the true extent of the examination is unclear. The survey identified isolated surface archeological materials in many locations across the Monument. However, only three sites were formally recorded during the 1973 investigations (48LN326, 48LN327, 48LN328).

Beginning in 1987 Bruce Jones (MWAC) conducted a series of survey and testing projects in the Monument in response to maintenance and interpretive developments (Jones 1987a). Jones surveyed the right-of-way for a road improvement project along Chicken Creek, a historic quarry location, four proposed maintenance facility locations, the site of a proposed new visitor center, a new interpretive trail layout near Cundick Ridge, three proposed spring development sites and the Rubey Point fence location. During these surveys Jones identified eight prehistoric archeological sites (48LN1690-1692; 48LN1721; 48LN1863-1865; and 48LN1761).

The sites located were Late Prehistoric, Historic or non datable. Most sites appeared to represent mainly surface manifestations reflecting short term use.

Site 48LN326 is possibly the most significant and contains a variety of archeological information in excellent depositional context, and has the potential to contribute significantly to an understanding of the prehistory of the Monument and the surrounding area. This site has not yet been nominated to the National Register of Historic Places.

In 1987 site 48LN1693, the Chicken Ranch, was determined ineligible for designation to the National Register of Historic Places. The main ranch house was subsequently removed.

Jones (1987) recommended that site 48LN1721 for nomination to the National Register of Historic Places because it "appears to have considerable local and regional significance due to factors of its preservation and the types of archeological information which it contains".

Specific information on all identified sites is available in the Cultural Sites Inventory, Midwest Archeological Center, revised 12\91.

List of Classified Structures

A small wooden A-frame structure and associated debris next to the Historic Quarry Trail is a historic period archeological site. The structure dates to possibly 1918, and was a temporary shelter for early fossil collectors David C. Haddenham and his grandson Robert. Hunt, of the Midwest Archeological Center, documented the structure in 1988.

The structure is listed on the "List of Classified Structures," IDLCS number 10708. Nomination to the National Register of Historic Places is being processed by the Rocky Mountain Regional Office.

The site and associated quarry are eligible for nomination to the National Register of Historic Places, under Criterion A; e.g., as a historic entity representing an unusual form of commerce that has been of local importance for over 100 years in the Kemmerer area. In this case, the archeological material may contribute to the historic significance of the site while not being significant enough in its own right to make it separately eligible for nomination to the National Register." (Hunt, 1991)

LCS ID#	PARK CODE	H.S.#	NAME OF BUILDING/ STRUCTURE	MGT. CODE	MGT. CATEGORY
10708	1468		Haddenham Cabin		

Museum Objects
The park museum collection consists of 3013 cataloged and approximately 165 noncataloged items.

The cataloged collection consists of 1025 paleontological pieces, 212 biologic specimens, 1750 historic artifacts, 31 archeological specimens, and 2 geologic objects. The noncataloged pieces are paleontological and geologic. The collection status is documented annually in the Collection Management Report, form 10-94.

Until December 1991 most collection items were stored in unheated buildings and were subject to temperature and humidity extremes. Upon completion of the park maintenance building (12\91) the collection was transferred into dedicated curatorial storage space. The museum storage area is a separate room in the maintenance building, protected by an automatic sprinkler system and fire alarm. This storage facility addresses many deficiencies identified on the park's Special Directive 80-1 checklist (rev. 1990).

Many of the paleontologic resources (McGrew collection) were damaged by exposure to radical temperature and humidity changes. The fossils are found in a kerogen-rich laminated micrite or horizontally layered matrix. Exposure to extreme environmental conditions causes the matrix to dehydrate and split along the horizontal planes. Twenty-five percent of the McGrew collection require extensive repair and another 25% require some repair.

Acquisition prior to 1989 was typically less than 10 items each year. In 1989 several pieces were purchased for interpretive exhibits. In 1991 a park paleontologist was hired, and additions to the collection have increased as cataloging backlogs, including the park photography collection, park archives and artifacts at Loma Linda University documented. Additional pieces are expected as important pieces are acquired to complete scientific gaps in the collection.

Curatorial records for the collection are complete. Catalog cards are complete, with working copies on file. An indexed photographic record of all museum objects in the physical custody of the Monument is maintained in accordance with App. O, NPS Museum Handbook, Part II.

A Housekeeping Plan, Collection Management Plan or Collection Storage Plan do not exist. They, and a Collection Condition Survey would be invaluable as we set priorities for conservation of the collection. The existing Scope of Collection Statement is adequate.

Cultural Landscapes
A Cultural Landscape Inventory is needed and a Cultural Landscape Management Plan if any sites are identified. The road corridor up the Butte has been identified by RMR, Cultural Resources Division as a possible Cultural Landscape.

Ethnographic Resources

Ethnographic resources are those natural and cultural resources of ongoing significance to contemporary peoples with traditional ties to Fossil Butte. Ethnographic resources may include plants used for medicinal purposes, animals, and landscapes associated with oral traditions, and items in the park collection. Consultation is necessary to determine which park resources are significant to whom and, in the process, assume the definition of "ethnographic resources."

Contemporary communities with potential affiliation to Fossil Butte include the Northern Arapaho, the Eastern and Western bands of the Shoshone in Idaho and Wyoming, the Bannock of Idaho, and the Uinta and Ouray Tribe in Utah. The ranching and sheepherding communities of Wyoming have traditional ties with Fossil Butte as the historical use of the land also included sheep and cattle grazing.

Ethnographic research and consultation with traditionally associated cultural groups is needed to comply with NPS policy and guidelines (NPS Management Policies 1988; draft ethnographic attachments to the final Resources Management Plan Guideline; and the Cultural Resources Management Guideline NPS-28). Specific actions proposed include an ethnographic overview and assessment that would compile, summarize, and evaluate data available on patterns of traditional uses and possibly contemporary uses of park resources.

The Monument has not been evaluated for ethnographic resources. An "Ethnographic Overview and Assessment" is needed.

III. RESOURCE MANAGEMENT PROGRAMS

ECOSYSTEM MANAGEMENT APPROACH

"Ecosystem Management" is a process entered into by the people and their governments of a more-or-less discrete region, which is bound together closely by intrinsic socio-economic interactions, unique cultural and natural resources and resource values and compatible environmental ethics; for the purposes of minimizing and/or mitigating potentially conflicting activities and values, instilling the importance of cooperative government and management, and sustaining the socio-economic system, cultural and natural resources, and environmental values indefinitely. (Dan Huff NPS)

The natural resources management programs and proposals are based on basic ecological tenets. Individual organisms and species can only be preserved by maintaining entire ecological units or ecosystems. The only sure way to perpetuate ecosystems is to minimize human disturbance and allow natural processes to mold individual elements within the system.

Our preferred course is a sequential process of learning what the resources are, developing an understanding of how they fit into the natural system, documentation of alterations from their natural conditions, formulation of protocols for mitigation of significant alterations, implementation of rehabilitation where necessary, and the formulation of a systematic programs such as long term monitoring for resources protection.

In practice, however, budget and staffing constraints typically preclude this sequential approach. Instead, most projects are reactionary in nature, often forego critical inventory priorities and are designed to address some crises.

OVERVIEW OF CURRENT PROGRAM AND NEEDS

To manage the resources of Fossil Butte National Monument, the National Park Service must identify what the resources are, their location, their relative significance, their sensitivities and management needs. Priorities for resources management include employee and visitor safety, collection of baseline resource inventories and establishing monitoring programs, identification, protection and reestablishment of natural process.

Without a staff dedicated to resource management issues, progress on even the most basic resource issues will be limited. Park staff responds to the most pressing needs in all disciplines out of necessity. Long term and proactive resource management does not happen under these conditions. Degradation of the resource may occur without the knowledge that it has been lost.

Identified here are our most pressing issues and current strategies. Scheduling and short term action plans are unrealistic to consider.

Major Resource Issues and Strategies
Baseline Data Collection
A baseline study and inventory of park resources, including documentation or the park paleontological resources and of the biotic environment is needed.

A baseline study and inventory of paleontological outcrops and sedimentological features relevant to Fossil Lake's paleohistory and the associated Wasatch Formation are critical to our long-term protection, understanding and management of scientifically important geological resources within the Monument and on adjacent lands.

A baseline study and inventory of plants, small mammals, insects, birds, and amphibians are needed and proposed for funding under the regional science program. Current inventories are not adequate for resource protection or management decisions. Adequate inventories will require two to three years of seasonal investigation to achieve an acceptable standard.

The current program includes: Funding is requested annually through the NRPP, CCR and other programs to inventory these park resources.

Fossil Theft
Fossil theft from the Fossil Lake sediments is a growing problem. The sediments lie in a 40 by 20 mile area mostly owned by the BLM Private lands that contain fossils are actively quarried. As the price of fossils increases, the motivation to steal them from federal and private land also increases. The BLM has discovered large illegal quarries in remote areas near the Monument. Fossil theft from the Monument is assumed to be occurring on a small scale.

Additional patrols and a fossil prospecting plan are critical to prevent fossil theft and locate fossils as they erode from the matrix.

The current program includes: Routine patrol of Monument land to protect park resources. Cooperate with BLM and county law enforcement to combat all fossil theft in the area. Identify additional resource staff as needed in RMAP and other funding processes.

Fire Management
With the termination of livestock grazing on the Monument after 1989, fine fuels are likely to accumulate. The extent of resulting fire hazard to the Monument and surrounding area is unknown. The additional fuels should support natural and prescribed fires.

The Grazing Impact Study, 1984, identifies the need for a let-burn policy to rejuvenate the sagebrush and aspen vegetation areas. Fire management remains a major concern for natural resource management.

The current program includes: The Fossil Butte N.M. "Fire Management Plan, 12\1989" remains in a draft stage. Additional planning is needed to implement research or prescribed fires. Current policy is to extinguish all fires as soon as possible. Research is required to ascertain the natural fire regime and management activities to best achieve it. Fire weather is recorded during the fire season.
Time required: 6 person days/year.(15 min/day x 180 days)

Erosion Control
Accelerated erosion along Chicken Creek is attributed to grazing, livestock pond dams and stream channelization. Photo monitoring begun in 1985, is ongoing to document these impacts and successes and failures of our efforts. It is believed that additional means will be required to reverse the erosional trend. Documented in park file D3219, Grounds-Erosion and Watershed Control.

The current program includes: In 1994 we began implementing the "Chicken Creek Restoration Plan". The plan includes establishing monitoring wells and channel cross sections. Over the next three years stream flows and channel erosion will be monitored. After three years the livestock dams will be removed. The data will be used to design a stream channel that has appropriate vegetation and will carry the stream flows.

Native Vegetation Annually since 1988, park personnel plant approximately 100 willow shoots in the stream bed. By re-establishing the native woody vegetation, some natural erosion control will return to the ecosystem. This project requires two person-days per year.

Check-Dams In 1984 a rock mattress and two check-dams were built in Chicken Creek to combat headwall erosion. Excelsior matting was added in 1989 to help vegetation become established. In 1988, Boy Scouts built 15 low, rock check-dams.

In 1991, park staff built three log check-dams using a "V" shaped structure that points upstream. The downstream side of the structure is protected with large cobble stones. Falling water is concentrated inside the "V".

Check dams serve to slow water flow and deposit sediment. The sediment provides a substrate for vegetative growth.

As funding and time allows, additional check-dams may be built at selected sites by volunteers, park personnel and YCC crews. Time required: one leader and two YCC enrollees, three days per year (six person days).

Erosion Photographic Monitoring Beginning in June each year, photographs of the stream bed are taken from 13 photo points. Photographs are taken every month, through September. Time required: four person days per year.

Adjacent Land Issues

Oil and Gas Massive oil and gas fields are located in the overthrust belt from Evanston northward past the Monument. Activities including seismic exploration along the entire western park boundary were permitted by the BLM and full-scale drilling occurred just outside the boundary. Several major companies have shown interest in developing gas from the Madison formation at the 13,000-foot level.

Coal Two large coal-strip mines operate 10 miles southeast of the Monument on a combination of federal and private lands. The FMC Corporation own Skull Point Mine and the Kemmerer Mine is owned by Pittsburg and Midway Coal Company, a subsidiary of Chevron.

Electric Generating Plant An electric generating plant, operated by PacifiCorp, is adjacent to the P&M Coal Mine. The power plant burns natural gas and coal from the P&M mine.

Union Pacific Railroad The Union Pacific Railroad passes along the southern boundary of the Monument. In June 1983, a landslide (slump) from the southeast corner of Fossil Butte N.M. destroyed the existing line. In 1984, Union Pacific rerouted the track a short distance to the south from the old line and constructed a new overpass to accommodate the new grade of old U.S. 30N, the main entrance road to the Monument. The old overpass was removed and the impacted area reseeded in 1985. Evidence of the old railroad grade and the impact on the area from the construction work remains.

Incineration Plant An incineration\recycling\landfill operation near Sage, Wyoming, seven miles west of the Monument has been proposed. Lincoln County business interests have undertaken efforts to develop a plan and economic and environmental analysis for this proposed tri-state operation.

The current program includes: Monitoring ongoing adjacent land use. Park staff attends public meetings and prepares written comments concerning actions that may impact the park. Time required: Five to fifteen person days per year.

Water Management

The Monument's authorizing legislation indicates that water excess to Monuments needs be made available to users outside the Monument. There is a need to develop a process to determine water quantities available to meet the Monument's needs. The question of water needs for the Monument now and in the future should be addressed. There is also a need to identify water rights associated with water uses within the Monument, and if necessary, take action to protect these uses.

Surface water from one spring is piped outside to livestock tanks outside the Monument. This has effectively de-watered a riparian area that once supported beavers.

The current program includes: Funding and technical support requests through the WASO Water Resources Division to document the park's water resources and address our other water resource needs.

Storage and Care of Collections
A new storage facility was completed in 1991, but consolidation and stabilization of the park's collections will take several years to complete. Complete documentation and extensive preparation work on individual Green River formation fossil specimens require the attention of the park's museum specialist, a qualified NPS preparator, or done by contract.

The enabling legislation specifies that scientific specimens be added to the collection over time, to promote the interpretation of scientifically important specimens. These efforts entail a workload not addressed in years past, due to a lack of facilities or adequate staff. Added to this will be efforts to allow visitor access to an active scientific quarry while insuring preservation and protection during visitor use.

The current program includes: Cyclic curatorial programs in 1990 through 1994 have allowed us to address many curatorial problems. Additional funding is required to complete documentation and develop the long term planning documents required for museum protection. Time required: 20 person days per year.

Other Resource Issues/Activities
Wildlife Monitoring
A wildlife monitoring program was initiated to collect basic wildlife occurrence information . Twice each month, May through September, park personnel visit ten sites just after daybreak and document all wildlife sightings. Time required: six person days per year.

Exotic Species
Black henbane, Bull Thistle, Musk Thistle Spotted Knapweed and Canada Thistle are some of several exotic species present in the park. Since these species are considered noxious weeds by the state we aggressively attempt to eliminate them.
Henbane is present along park roads where it was apparently introduced with gravel road material. Noxious to animals and very prolific, it spreads rapidly if not controlled.

Current park program includes: Chopping of individual plants below the level of the crown. Plants cut above the crown resprout and flower. Typically, half the plants resprout. Beginning in 1990, we sprayed the plants with the 2,4-D herbicide. By spraying in early June, and again in the fall we can probably control most of the current and next year's growth. Chopping of henbane requires six days work by three people.

Canada thistle is found in recently disturbed sites, along road shoulders and slumps. One large infestation at spring #1 is extremely vigorous.

Current park program includes: Chopping the stalks in the bud stage to prevent the plant from going to seed and using 2,4-D herbicide at appropriate locations. Herbicide use near water sources is prohibited because of potential water contamination. Time required: Fifteen person days per year.

Spotted Knapweed, Musk Thistle and Bull Thistle are present in small numbers in the park.

Current park program includes: Spraying these species with herbicide in late June and again in mid-August if needed.

Experimental insect control of the thistle is being attempted under the guidance of Dr. Robert Lavigne, a University of Wyoming entomologist. A native, sap feeding insect, Corythuca distincta (lace bug) was collected from Platte thistle and Nettle plants in the park and released on Canada thistle plants. An additional population of lace bugs from near Lander, WY (130 miles east) was released on Canada thistle plants near Spring #1.

Patrol
Maintenance and law enforcement activities include regular patrol of the Monument to prevent damage to the resource.

Current park program includes: Regular patrols serve to protect the resource from vandalism, fossil collecting and hunting. Rangers contact as many visitors as possible to provide them with information. Hunters passing through the Monument are contacted to be sure they know where the Monument boundaries are. Time required: 24 person days per year.

Maintenance
Boundary fencing protects the Monument from livestock grazing and clearly marks the boundary to people preventing most inappropriate use. Damage occurs by snow drifting over the fence, animals crossing the fence, human misuse and other weather events. Lay-down fence is used in areas where snow drifts stretch or break the wire.

Each spring, maintenance personnel travel the entire boundary to repair any damaged fence and erect the lay-down fences. This activity is scheduled for completion before May 15, the date surrounding public land opens for grazing. Some sheep grazing occurs on private land, east of the Monument prior to May 15. This portion of the fence is maintained as early in April as is possible. Time required: 14 person days.

Raptor Nest Survey
Cain's 1989 survey identified six raptor nests.

Each nest site is visited in April and June in an attempt to document nesting attempts and nesting success. Time required: three person days.

Annual Archeological Inspection
The two major archaeologic resource sites may be subjected to vandalism and natural erosional factors. Artifacts may surface due to natural processes (48LN326 and 48LN1721).

Sites are inspected to determine if there has been any disturbance or if artifacts have surfaced. Time required: one person day per year.

Annual Museum Collection Inventory
NPS guidelines require an annual inventory of museum collections. In December an inventory of the museum collection is conducted as per NPS guidelines. Time required: three person days per year.

Interpretation
Visitors may inadvertently damage Monument resources because they are unaware their action may cause harm. Yet visitors can be our most valuable advocate when they understand park values.

Our interpretive program strives to educate our visitors to the value of fossil and other natural resources that occur in the Monument. Time required: Ten person days per year.

BLM Photo Monitoring
Changes in vegetation due to the removal of grazing are of interest to the local BLM office.

In October 1990, the Kemmerer BLM Resource Office began a photo monitoring program at three sites on the Monument. The photographs will document changes in vegetation over time, particularly in response to the removal of grazing. Time required: One-half person day every three years.

Program Management

Staffing
The Resource Management program is under the general guidance of the park superintendent and is directly supervised by the chief ranger.

The chief ranger is responsible for overall planning, meeting compliance requirements, resource protection, administration of scientific research and supervision of field work. The museum curator-geology and seasonal museum technician\preparator assist with management of the museum collection and paleontologic resources. The park interpreter, seasonal interpretive staff and seasonal biological technician assist in the weed mapping, native plant revegetation, wildlife monitoring and erosion photo monitoring programs. The park maintenance staff, including YCC enrollees, completes the noxious weed mowing and chopping. One seasonal maintenance person helps in weed spraying.

In 1994 staff skills are in field resource management activities, paleontology and environmental education.

Needs

To address the many resource management needs additional staffing is required. Our first priority is to hire a full time paleontologist to coordinate and evaluate scientific research. Currently the park functions with the superintendent, chief ranger and museum specialist fulfilling these duties.

Our second priority is for one additional staff member to implement resource management projects, conduct resource monitoring, and collect and compile GIS data.

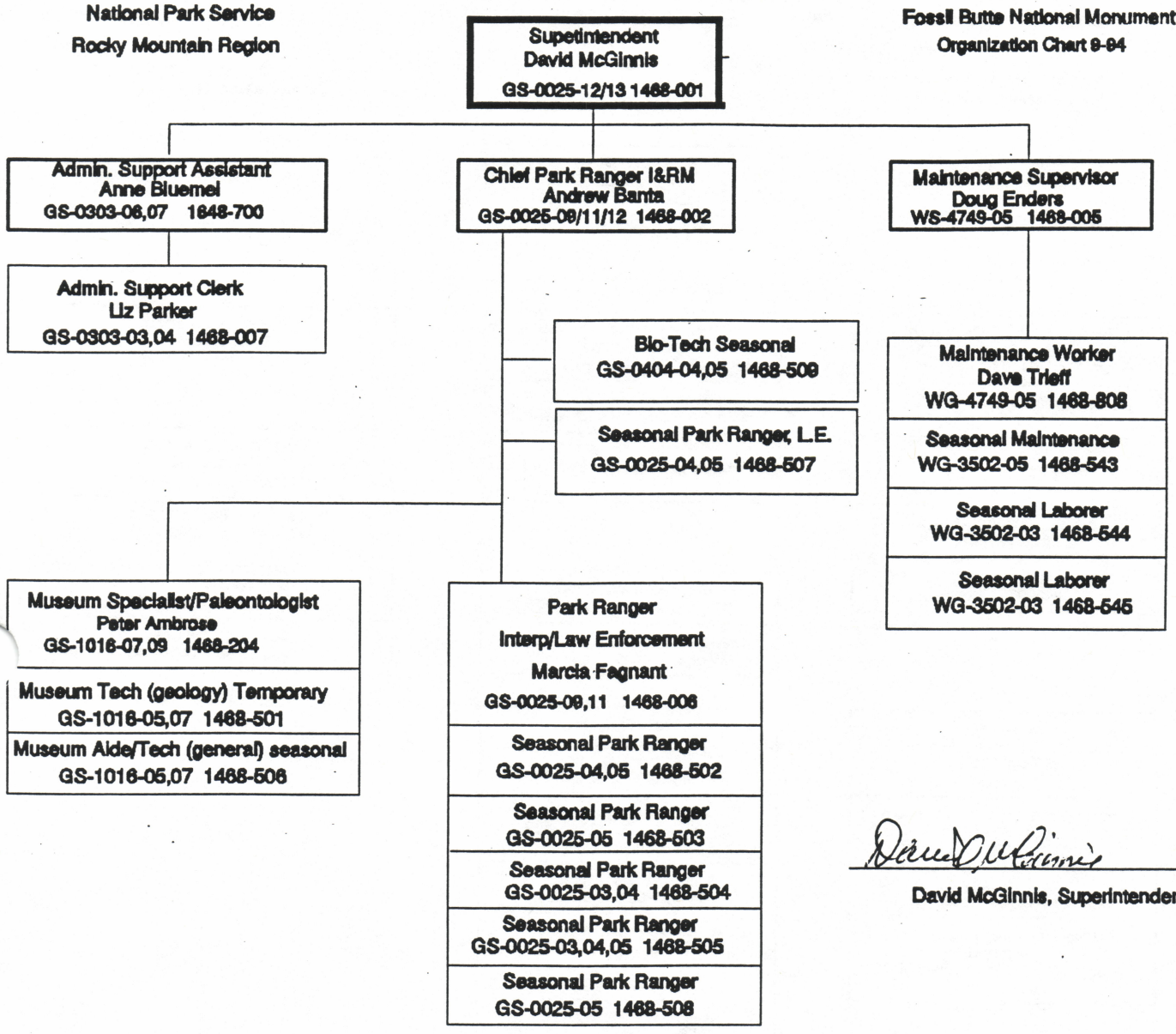
Our third need is a natural resources scientist to develop baseline inventory studies, conduct and evaluate air and sound quality studies, conduct park specific research and environmental compliance.

The following pages identify the segments of the Monument's resource management program including:

-A current organizational chart for Fossil Butte N.M.
-A target organization chart for Fossil Butte N.M.
-Current Budget
-Target Budget

National Park Service
Rocky Mountain Region

Fossil Butte National Monument
Organization Chart 9-94



David McGinnis, Superintendent

PROPOSED NR-MAP ORGANIZATION CHART for 1997
"Stewardship Today for Parks Tomorrow"
Natural Resource Management Initiative

National Park Service
Rocky Mountain Region

Fossil Butte National Monument
Organization Chart 1997

Superintendent
David McGinnis
GS-0025-12/13 1468-001

Admin. Support Assistant
Anne Bluemel
GS-0303-06/07 1468-700

proposed GS-9

Admin. Support Clerk
Liz Parker
GS-0303-03/04 1468-007

proposed GS-5

proposed
Paleontologist/Geologist
GS 1350 or 1315-11/12

Museum Specialist/Paleontologist
Peter Ambrose
GS-1016-07/09 1468-204

Museum Tech (geology) Temporary
GS-1016-05/07 1468-501

Museum Aide/Tech (general)
seasonal
GS-1016-05/07 1468-506

Chief Park Ranger I&RM
Andrew Banta
GS-0025-09/11/12 1468-002

proposed GS-401-11
Resource Management Specialist

proposed GS-401-9
Resource Management Specialist

Bio-Tech Seasonal
GS-0404-04/05 1468-509

Seasonal Park Ranger, L.E.
GS-0025-04/05 1468-507

Park Ranger
Interp/Law Enforcement
Marcia Fagnant
GS-0025-09/11 1468-006

Seasonal Park Ranger
GS-0025-04/05 1468-502

Seasonal Park Ranger
GS-0025-05 1468-503

Seasonal Park Ranger
GS-0025-03/04 1468-504

Seasonal Park Ranger
GS-0025-03/04/05 1468-505

Seasonal Park Ranger
GS-0025-05 1468-508

Student Conservation Aid (SCA)
volunteer-2

Maintenance Supervisor
Doug Enders
WS-4749-05 1468-005

Maintenance Worker
Dave Trieff
WG-4749-05 1468-808

Seasonal Maintenance
WG-3502-05 1468-543

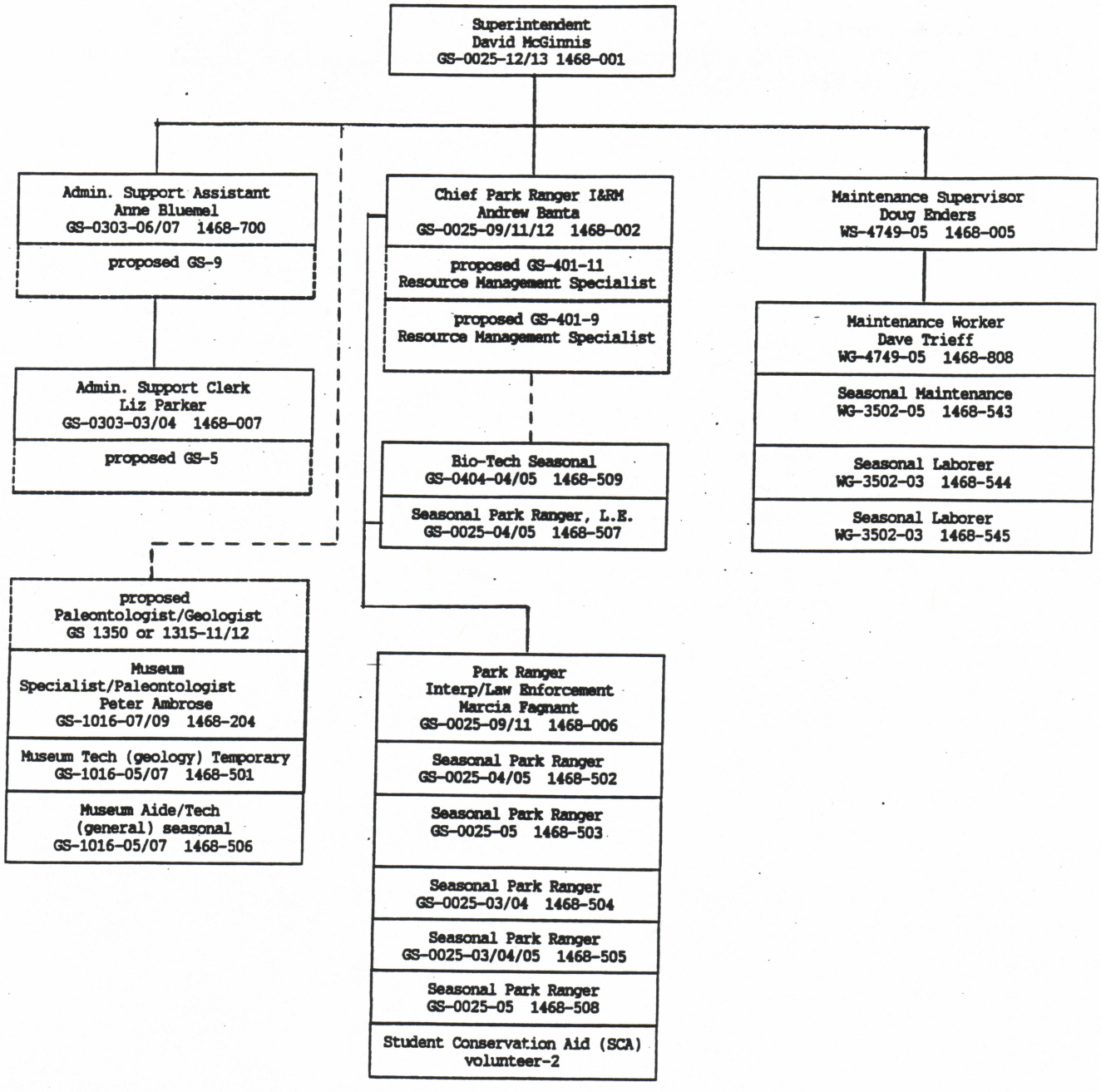
Seasonal Laborer
WG-3502-03 1468-544

Seasonal Laborer
WG-3502-03 1468-545

PROPOSED NR-MAP ORGANIZATION CHART for 1997
"Stewardship Today for Parks Tomorrow"
Natural Resource Management Initiative

National Park Service
Rocky Mountain Region

Fossil Butte National Monument
Organization Chart 1997



Current Budget
Park budget for FY 1995 is $357,000 with 9 FTEs.

Target Budget
Park budget including the three programs identified in RMAP (12-1994) would require $627,000.

Program Printouts

Table 1, lists the park resource management staff for the current fiscal year. It is updated annually.

Table 2, Current Year Resources Funding that displays accounts and types of projects funded for the current fiscal year. Updated annually.

Programming Sheet 1, Cultural and Natural Resource Projects funded for the current fiscal year. Updated annually.

Programming Sheet 2, Cultural and Natural Resource Projects identified but unfunded for the current fiscal year. Updated annually.

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TABLE 1
NPS RESOURCE PERSONNEL
(current year only)

FY: 95
PARK: FOBU
REGION: RMRO

TYPE OF NPS EMPLOYEE	FTEs OF RESOURCES WORK		
	Natural	Cultural	Total
Research Scientists	0.0	0.0	0.0
Resources Specialists	0.6	0.4	1.0
025 Park Rangers Res Mgmt	0.6	0.0	0.6
025 Park Rangers Res Prot	0.5	0.0	0.5
025 Park Rangers Res Interp	0.0	0.0	0.0
Maintenance Personnel	0.1	0.0	0.1
Total of RES Personnel	1.8	0.4	2.2
TOTAL PARK FTE: 10.0 PERCENT	18.0%	4.0%	22.0%

End of data

TABLE 2
NATURAL AND CULTURAL
CURRENT YEAR FUNDING
($ in thousands - by activity type)

FUNDING SOURCE	TOTAL	RES	MIT	MON	PRO	INT	ADM
PNR1	2.50	0.00	1.50	1.00	0.00	0.00	0.00
SOTH	17.50	0.00	17.50	0.00	0.00	0.00	0.00
TOTAL	20.00	0.00	19.00	1.00	0.00	0.00	0.00

End of data

PROGRAMMING SHEET 1
CULTURAL
CURRENT YEAR FUNDED ACTIVITIES
($ in thousands)

PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	CURRENT YEAR 1995 $$	CURRENT YEAR 1995 FTE	OUTYEAR 1 1996 $$	OUTYEAR 1 1996 FTE	OUTYEAR 2 1997 $$	OUTYEAR 2 1997 FTE	OUTYEAR 3 1998 $$	OUTYEAR 3 1998 FTE	TOTAL $$	TOTAL FTE
No relevant data																

End of data

PROGRAMMING SHEET 1
NATURAL and CULTURAL
CURRENT YEAR FUNDED ACTIVITIES
($ in thousands)

FY: 95
PARK: FOBU
REGION: RMRO

PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	CURRENT YEAR 1995 $$	CURRENT YEAR 1995 FTE	OUTYEAR 1 1996 $$	OUTYEAR 1 1996 FTE	OUTYEAR 2 1997 $$	OUTYEAR 2 1997 FTE	OUTYEAR 3 1998 $$	OUTYEAR 3 1998 FTE	TOTAL $$	TOTAL FTE
No relevant data																

End of data

PROGRAMMING SHEET 1
NATURAL
CURRENT YEAR FUNDED ACTIVITIES
($ in thousands)

PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	CURRENT YEAR 1995 $$	CURRENT YEAR 1995 FTE	OUTYEAR 1 1996 $$	OUTYEAR 1 1996 FTE	OUTYEAR 2 1997 $$	OUTYEAR 2 1997 FTE	OUTYEAR 3 1998 $$	OUTYEAR 3 1998 FTE	TOTAL $$	TOTAL FTE
140.001	DOCUMENT DAILY WEATHER CNDTN.S, RCD. MAJOR WX EVENT EQUIP/92 COMPLN/93			N20	PKBASE-NR	MON	1.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.00	0.1
350.001	CONTROL EXOTIC PLANTS			N05	PKBASE-NR	MIT	1.50	0.1	1.50	0.1	1.50	0.1	0.0	0.0	4.50	0.3
					SVC-OTHER	MIT	5.00	0.3	5.00	0.3	0.0	0.0	0.0	0.0	10.00	0.6
					Subtotal		6.50	0.4	6.50	0.4	1.50	0.1	0.00	0.0	14.50	0.9
520.001	RESTORATION OF CHICKEN CREEK			N06 N12	SVC-OTHER	MIT	12.50	0.5	0.0	0.0	0.0	0.0	0.0	0.0	12.50	0.5
3 projects printed																
					Grand Total		20.00	1.0	6.50	0.4	1.50	0.1	0.00	0.0	28.00	1.5

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PK PRI	PROJECT NUMBER	PROJECT TITL	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
0	090.000	DEVELOP LIST OF CLASSIFIED STRUCTURES			C02	RG-REG-MT	RES	5.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.00	0.1
0	015.002	ETHNOGRAPHIC PARK PROGRAM			C04	PKBASE-CR	MON	10.00	0.2	10.00	0.2	10.00	0.2	10.00	0.2	40.00	0.8
0	015.000	ETHNOGRAPHIC OVERVIEW, ASSESSMENT		ETHN	C04 C01	CRPP	RES	30.00	1.0	15.00	0.5	7.00	0.2	0.0	0.0	52.00	1.7
1	012.001	EMERGENCY MGMT. PLAN FOR MUSEUM COLLECTION NEEDED		OBJC	C09	TEMP$-CR	PRO	5.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.00	0.1
2	003.000	COMPLETE DOCUMENTATIO N OF MUSEUM COLLECTION		OBJC	C03	RG-CR-MTN	MIT	2.50	0.0	8.00	0.0	0.0	0.0	0.0	0.0	10.50	0.0
						CRPP	MIT	0.0	0.0	7.00	0.4	0.0	0.0	0.0	0.0	7.00	0.4
						CRPP	PRO	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.5	10.00	0.5
						Subtotal		2.50	0.0	15.00	0.4	0.00	0.0	10.00	0.5	27.50	0.9
3	004.000	DOCUMENT HISTORIC STRUCTURE, DEVELOP PRES. GUIDLINE		STRC	C05 C06	CRPP	RES	2.00	0.0	5.00	0.0	0.0	0.0	0.0	0.0	7.00	0.0
3	011.002	UPDATE SCOPE OF COLLECTION STATEMENT		OBJC	C09	PKBASE-CR	ADM	0.0	0.0	0.0	0.0	0.0	0.0	1.00	0.0	1.00	0.0
4	011.000	INVENTORY AND MONITOR HUMAN ACTIVITIES			C18	SVC-OTHER	RES	25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.00	0.0
5	012.002	DEVELOP COLLECTION MANAGEMENT PLAN.		OBJC	C09	CRPP	ADM	6.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.00	0.0

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PROGRAMMING SHEET 2
CULTURAL
UNFUNDED ACTIVITIES
($ in thousands)

FY: 95
PARK: FOBU
REGION: RMRO

PK PRI	PROJECT NUMBER	PROJECT TITL	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
6	006.000	MUSEUM COLLECTION CONDITION SURVEY		OBJC		CRPP	ADM	6.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.00	0.0
7	009.000	CONSERVATION TREATMENT FOR MUSEUM OBJECTS		OBJC	C15	CRPP	MIT	15.00	0.5	0.0	0.0	0.0	0.0	0.0	0.0	15.00	0.5
10	002.000	NEED ARCHEOLOGICAL INVENTORY, N.R. NOMINATION.		SITE	C02 C04	CRPP	RES	40.00	0.0	40.00	0.0	20.00	0.0	0.0	0.0	100.00	0.0
11	063.001	UPDATE PARK ADMINISTRATIVE HISTORY			C01	TEMP$-OTH	ADM	10.00	0.5	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.5
12	008.000	DEVELOP CULTURAL LANDSCAPE INVENTORY, MGMT PLAN		CULL	C11	CRPP	RES	15.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.00	0.0
14	015.001	ETHNOGRAPHIC STUDIES HISTORY OF FOSSIL BUTTE			C10	TEMP$-OTH	RES	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0
	15 projects printed					Grand Total		181.50	2.4	85.00	1.1	37.00	0.4	21.00	0.7	324.50	4.6

End of data

PROGRAMMING SHEET 2
NATURAL and CULTURAL
UNFUNDED ACTIVITIES
($ in thousands)

FY: 95
PARK: FOBU
REGION: RMRO

PK PRI	PROJECT NUMBER	PROJECT TITL	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	STARTING YEAR		OUTYEAR 1		OUTYEAR 2		OUTYEAR 3		TOTAL	
								$$	FTE	$$	FTE	$$	FTE	$$	FTE	$$	FTE
1	010.001	ADMINISTRATION OF RESOURCES MANAGEMENT PROGRAM				PKBASE-NR	ADM	0.0	0.0	270.00	3.0	270.00	3.0	270.00	3.0	810.00	9.0
12	062.001	DEVELOP GIS SYSTEM FOR PARK			N20	GIS	ADM	10.00	0.2	10.00	0.2	10.00	0.2	10.00	0.2	40.00	0.8
	2 projects printed																
						Grand Total		10.00	0.2	280.00	3.2	280.00	3.2	280.00	3.2	850.00	9.8

End of data

PROGRAMMING SHEET 2
NATURAL
UNFUNDED ACTIVITIES
($ in thousands)

PK PRI	PROJECT NUMBER	PROJECT TITL	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
0	360.001	RESTORE NATIVE VEGETATION			N05 N20	PKBASE-NR	MIT	0.0	0.0	5.00	0.3	5.00	0.3	0.0	0.0	10.00	0.6
0	001.100	DEVELOP EXHIBIT QUARRY SHELTER			N20	RG-NS-RES	RES	50.00	0.4	0.0	0.0	0.0	0.0	0.0	0.0	50.00	0.4
0	200.000	BASELINE WATER INFORMATION			N11 N12	NRPP	RES	5.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	0.0
						NRPP	MON	5.00	0.0	5.00	0.0	5.00	0.0	0.0	0.0	15.00	0.0
						Subtotal		10.00	0.0	5.00	0.0	5.00	0.0	0.00	0.0	20.00	0.0
1	590.000	REHAB F. LAKE EXP. QUARRY				SVC-OTHER	MIT	4.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.00	0.1
1	001.201	OPEN SCIENTIFIC QUARRY			N23	NRPP	RES	20.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.00	0.0
1	571.000	WASATCH FORMATION PALEONTOLOGY SURVEY & ASSESSMENT			N20	NRPP	RES	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0
2	710.001	DOCUMENT EFFECTS OF MINERAL EXPLORATION			N10 N20	AIR-QUAL	RES	100.00	0.0	50.00	0.5	50.00	0.5	0.0	0.0	200.00	1.0
						WATER-RES	RES	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0
						ACID-PREC	RES	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0
						NR-I&M	MON	10.00	0.5	10.00	0.5	10.00	0.5	0.0	0.0	30.00	1.5
						Subtotal		130.00	0.5	60.00	1.0	60.00	1.0	0.00	0.0	250.00	2.5
2	510.000	DETERMINE SALINE/FRESH WATER MARGINS OF FOSSIL LAKE			N20	SVC-OTHER	RES	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0
2	510.003	RELATIONSHIP OF SEDIMENTARY CYCLES TO PALEOCLIMATE			N20	SVC-OTHER	RES	20.00	0.0	20.00	0.0	20.00	0.0	0.0	0.0	60.00	0.0

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PROGRAMMING SHEET 2
NATURAL
UNFUNDED ACTIVITIES
($ in thousands)

PK PRI	PROJECT NUMBER	PROJECT TITL	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
3	062.002	DEVELOP GIS LOCALITIES MAP FOR PARK USE GPS TO MAP LOCALITIES	10-238		N20	GIS	RES	10.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.1
3	510.001	RECOGNITION OF SPECIFIC COLLECTION SITES USING HI-RES SITE RECOG.			N20	SVC-OTHER	RES	20.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.00	0.0
4	753.001	COLLECT FLORA AND FAUNA BASELINE DATA			N20	RG-NS-RES	RES	15.00	0.0	15.00	0.0	0.0	0.0	0.0	0.0	30.00	0.0
						RG-NS-RES	MON	5.00	0.0	5.00	0.0	10.00	0.0	10.00	0.0	30.00	0.0
						Subtotal		20.00	0.0	20.00	0.0	10.00	0.0	10.00	0.0	60.00	0.0
4	510.002	IMPLICATIONS OF LATERALLY DISCONTINUOU S MUDSTONE			N20	NRPP	RES	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0
5	350.001	CONTROL EXOTIC PLANTS			N05	SVC-OTHER	MIT	0.0	0.0	0.0	0.0	0.0	0.0	5.00	0.1	5.00	0.1
9	520.001	RESTORATION OF CHICKEN CREEK			N06 N12	SVC-OTHER	MIT	0.0	0.0	0.0	0.0	7.50	0.2	25.00	0.5	32.50	0.7
10	393.001	DETERMINE NATURAL FIRE REGIMES			N07	RG-NS-RES	RES	10.00	0.0	5.00	0.0	5.00	0.0	0.0	0.0	20.00	0.0
11	340.001	INVENTORY AND MONITOR T&E PLANTS			N03	NRPP	RES	5.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	0.0
						NRPP	MON	5.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	0.0
						Subtotal		10.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	10.00	0.0
13	200.001	BASELINE INVENTORY WATER RESOURCES			N12 N20	SVC-OTHER	RES	10.00	0.0	10.00	0.0	10.00	0.0	10.00	0.0	40.00	0.0

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PK PRI	PROJECT NUMBER	PROJECT TITL	PKG NUM	CULT RES TYPE	SYSTEM-WIDE ISSUE	FUNDING SOURCE	ACT TYP	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
18 projects printed																	
						Grand Total		344.00	1.1	125.00	1.3	122.50	1.5	50.00	0.6	641.50	4.5

End of data

IV. PROJECT STATEMENTS

Sorted by: Project Number

PRIORITY	PROJECT NUMBER	YEAR	PROJECT TITLE	SUB-TITLE	FUNDED	UNFUNDED
25	FOBU-C-001.000	94	COMPLETE COLLECTION STORAGE PLAN		0.00	0.00
25	FOBU-C-002.000	94	NEED ARCHEOLOGICAL INVENTORY, N.R. NOMINATION.		0.00	100.00
25	FOBU-C-003.000	94	COMPLETE DOCUMENTATION OF MUSEUM COLLECTION		5.00	27.50
25	FOBU-C-004.000	94	DOCUMENT HISTORIC STRUCTURE, DEVELOP PRES. GUIDLINE		0.00	7.00
25	FOBU-C-005.000	94	CONSTRUCT NEW MUSEUM STORAGE FACILITY		0.00	0.00
25	FOBU-C-006.000	94	MUSEUM COLLECTION CONDITION SURVEY		0.00	6.00
25	FOBU-C-007.000	94	IMPLEMENT INTEGRATED PEST MANAGEMENT PROGRAM		0.00	0.00
25	FOBU-C-008.000	94	DEVELOP CULTURAL LANDSCAPE INVENTORY, MGMT PLAN		0.00	15.00
25	FOBU-C-009.000	94	CONSERVATION TREATMENT FOR MUSEUM OBJECTS		0.00	15.00
25	FOBU-C-011.000	94	INVENTORY AND MONITOR HUMAN ACTIVITIES		0.00	25.00
99	FOBU-C-011.002	94	UPDATE SCOPE OF COLLECTION STATEMENT		0.00	1.00
13	FOBU-C-012.001	94	EMERGENCY MGMT. PLAN FOR MUSEUM COLLECTION NEEDED		0.00	5.00
25	FOBU-C-012.002	94	DEVELOP COLLECTION MANAGEMENT PLAN.		0.00	6.00
25	FOBU-C-015.000	94	ETHNOGRAPHIC OVERVIEW, ASSESSMENT		0.00	52.00
25	FOBU-C-015.001	94	ETHNOGRAPHIC STUDIES HISTORY OF FOSSIL BUTTE		0.00	10.00
25	FOBU-C-015.002	94	ETHNOGRAPHIC PARK PROGRAM		0.00	40.00
25	FOBU-C-063.001	94	UPDATE PARK ADMINISTRATIVE HISTORY		0.00	10.00
25	FOBU-C-075.000	94	NOMINATION TO NATIONAL REGISTER OF HISTORIC PLACES		0.00	0.00
25	FOBU-C-090.000	94	DEVELOP LIST OF CLASSIFIED STRUCTURES		0.00	5.00
Resource Type Sub-total----------					5.00	324.50
1	FOBU-I-010.001	94	ADMINISTRATION OF RESOURCES MANAGEMENT PROGRAM		50.00	810.00
25	FOBU-I-062.001	94	DEVELOP GIS SYSTEM FOR PARK		0.00	53.00
Resource Type Sub-total----------					50.00	863.00
98	FOBU-N-001.100	94	DEVELOP EXHIBIT QUARRY SHELTER		0.00	50.00
3	FOBU-N-001.200	94	DEVELOP SCIENTIFIC QUARRY		11.00	0.00
3	FOBU-N-001.201	94	OPEN SCIENTIFIC QUARRY		0.00	20.00
6	FOBU-N-062.002	94	DEVELOP GIS LOCALITIES MAP FOR PARK	USE GPS TO MAP LOCALITIES	0.00	10.00
99	FOBU-N-140.001	92	DOCUMENT DAILY WEATHER CNDTN.S, RCD. MAJOR WX EVENT	EQUIP/92 COMPLN/93	4.00	0.00
12	FOBU-N-200.000	94	BASELINE WATER INFORMATION		0.00	20.00
12	FOBU-N-200.001	94	BASELINE INVENTORY WATER RESOURCES		0.00	40.00
8	FOBU-N-340.001	94	INVENTORY AND MONITOR T&E PLANTS		0.00	10.00
7	FOBU-N-350.001	94	CONTROL EXOTIC PLANTS		21.00	5.00
12	FOBU-N-360.001	94	RESTORE NATIVE VEGETATION		5.00	10.00
9	FOBU-N-393.001	94	DETERMINE NATURAL FIRE REGIMES		0.00	20.00
25	FOBU-N-510.000	94	DETERMINE SALINE/FRESH WATER MARGINS OF FOSSIL LAKE		0.00	10.00
5	FOBU-N-510.001	94	RECOGNITION OF SPECIFIC COLLECTION SITES	USING HI-RES SITE RECOG.	0.00	20.00
25	FOBU-N-510.002	94	IMPLICATIONS OF LATERALLY DISCONTINUOUS MUDSTONE		0.00	10.00
25	FOBU-N-510.003	94	RELATIONSHIP OF SEDIMENTARY CYCLES TO PALEOCLIMATE		0.00	60.00
4	FOBU-N-520.001	94	RESTORATION OF CHICKEN CREEK		25.00	157.50
11	FOBU-N-520.003	94	WRD ISSUES; EROSION EVALUATION		0.00	0.00
25	FOBU-N-520.005	94	WRD WATER RESOURCES SCOPING REPORT		0.00	0.00
99	FOBU-N-540.001	92	DETERMINE PALEO FLUCTUATIONS OF FOSSIL LAKE		0.00	0.00
25	FOBU-N-570.001	93	DCMNT. FOSSIL RESRCES.,DEVEL. MNTRNG& PROTEC. PLAN		0.00	0.00
2	FOBU-N-571.000	94	WASATCH FORMATION PALEONTOLOGY SURVEY & ASSESSMENT		0.00	10.00
25	FOBU-N-590.000	94	REHAB F. LAKE EXP. QUARRY		0.00	4.00
25	FOBU-N-710.001	94	DOCUMENT EFFECTS OF MINERAL EXPLORATION		0.00	250.00
25	FOBU-N-753.001	94	COLLECT FLORA AND FAUNA BASELINE DATA		0.00	60.00

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